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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,166	01/17/2002	Heinz Auer	50505	4816
26474	7590	04/07/2004	EXAMINER	
KEIL & WEINKAUF 1350 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			PUTTLITZ, KARL J.	
			ART UNIT	PAPER NUMBER
			1621	

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/031,166

Applicant(s)

AUER ET AL.

Examiner

Karl J. Puttlitz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 5-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

The objection to the specification and the objection to claims 3, 4, and 7 has been withdrawn in view of Applicant's amendments. The rejection under § 112, second paragraph has been withdrawn in part and maintained in part. The rejection under § 103 is maintained.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

While the examiner understands that the claims are read from the standpoint of those of ordinary skill, the abbreviations TR and TA in claim 1 are confusing because it is unclear what these abbreviations are referring to. Applicant is therefore requested to insert their respective meanings at the earliest instance in claim 1.

Applicant has failed to set forth remarks in connection with this ground of rejection, therefore, the rejection is maintained.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent No. 4,661,624 to Chang et al. (Chang).

The invention covered in the rejected claims comprises, *inter alia*, a process for preparing methyl formate by reacting methanol with carbon monoxide under superatmospheric pressure and elevated temperature in the presence of methoxide salts (alkali or alkaline earth metals), with recirculating lines of liquid phase, wherein the catalyst and its degradation products are kept in solution. A TR:TA split is controlled as a function of alkali metal formate or alkaline earth metal formate content so that solid precipitates of alkali metal salts or alkaline earth metal salts are prevented. The catalyst is removed in a desalting apparatus.

Other claimed embodiments comprise 2 to 5 reactor elements, adding additional steam and/or hot water to a discharge part of TA of the liquid phase, and the desalting apparatus is in an integrated system with a distillation apparatus.

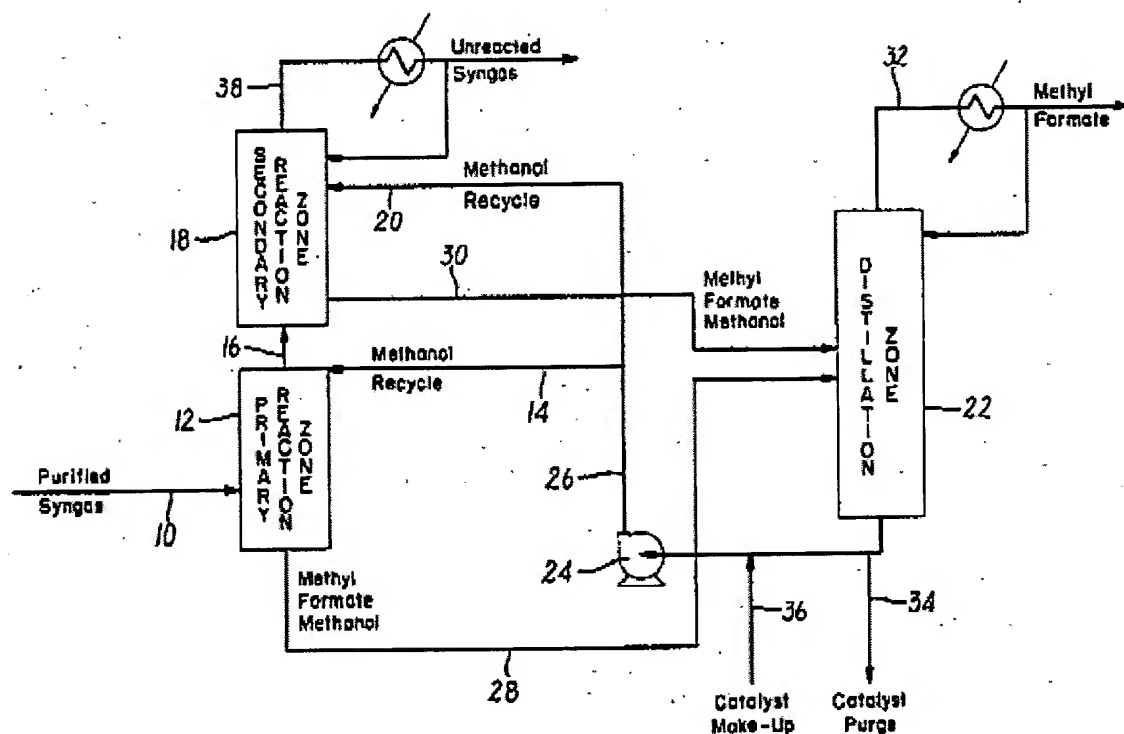
Chang teaches a process for the synthesizing of a lower alkyl formate, preferably methyl formate, in a liquid phase reaction by reacting a lower alkyl alcohol, preferably methanol, with a CO containing gas, at relatively high CO partial pressures and moderate temperatures. The reaction is catalyzed by the presence of relatively high concentrations of an effective homogeneous catalyst, preferably a homogeneous alkali metal methoxide, most preferably sodium methoxide, in the alcohol. The unreacted

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alcohol being separated from the alkyl formate reaction product by a suitable distillation.

The unreacted alcohol, together with a fresh amount, if required, for replenishment, is recycled in two streams to the corresponding two synthesis, reaction zones, if two reaction zones are employed. See column 3, lines 10-29.

The figure schematically illustrates the number of reactor elements, and the cascade nature of the reactors:



Also Chang teaches removing catalyst and recirculating methanol, at , for example, column 4, lines 10-20: “[r]eturning to the figure, the two recycle methanol streams 14 and 20 both originate from the bottom of the distillation zone 22 and are

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pumped by pump 24 through line 26 back to the primary and secondary reaction zones. Also in the case of multiple reaction zones, the two effluent streams 28 and 30 emanating from the primary and secondary reactors respectively, containing the product methyl formate, unreacted methanol and homogeneous catalyst pass into the distillation zone 22 in two separate effluent streams.” The distillation and catalyst desalting are integral in element 22 ( Claim 4). See Figure above.

The difference between the process claimed in the rejected claims and the process disclosed in Chang is that Chang does not explicitly state that a TR:TA split is controlled as a function of alkali metal formate or alkaline earth metal formate content so that solid precipitates of alkali metal salts or alkaline earth metal salts are prevented.

However, Chang does teach that “the concentration of the formed product methyl formate in methanol is low this permits higher concentrations of the homogeneous catalyst to be used without fear of catalyst precipitation, thereby resulting in a higher reaction rate and, consequently, a smaller reactor cost. Such an increase in catalyst concentration is possible because the preferred catalysts such as sodium methoxide have a substantial solubility in methanol, but a very low solubility in methyl formate. Thus a lower concentration of methyl formate product in the methanol stream permits the use of higher concentrations of catalyst without the danger of *harmful precipitation and the harmful results accompanying this phenomenon*.” See column 5, lines 35-48.

One of ordinary skill would expect that a stream of methyl formate would contain alkali metal formate or alkaline earth metal formate salts. Therefore, one of ordinary skill would be motivated to modify Chang to include a step of controlling catalyst

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solubility by controlling alkali metal formate or alkaline earth metal formate salts, since Chang teaches that controlling concentrations of methyl ester product prevents harmful precipitation, and a stream of methyl formate would contain alkali metal formate or alkaline earth metal formate salts.

Accordingly, controlling the metal salt of formate instead of the methyl ester in order to prevent precipitation of the catalyst is *prima facie* obvious in view of Chang since there is a reasonable expectation of success. See M.P.E.P. § 2143, discussing the requirements of a *prima facie* case, including a reasonable expectation of success.

Applicant replies that, in contrast to the disclosure of Chang, the instant invention utilizes low concentrations of catalyst, 0.05 to 0.5% by weight of the liquid reaction mixture, in order to obtain a high concentration of methyl formate in the effluent from the reactor.

However, Chang teaches that the prior art utilizes low concentration of catalyst. See column 1, lines 40-43. Therefore, using low concentrations of catalyst in conjunction with the claimed process is known in the art. Accordingly, this aspect of the instant invention is not given patentable weight.

### ***Conclusion***

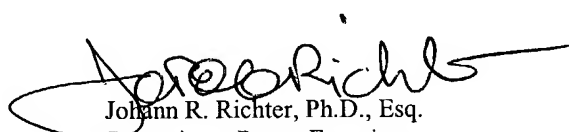
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday-Friday (alternate).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (571) 272-0646.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1235.

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